



Upper Class E Traffic Management (ETM)

Future Operational Environment above FL600

- **New types of operations**

- Hypersonic flight, reintroduction of supersonic passenger flights, and very slow or on-station long endurance flights

- **ATM scalability**

- Current manner of ATM service delivery cannot cost-effectively scale to meet the needs of the envisioned ETM environment
- Current ATM services may not be desired in the ETM environment

- **Solutions are needed that**

- Scale beyond current ATM infrastructure and manpower resources
- Promote shared situation awareness among Operators
- Include **Cooperative Separation** and **Provided Separation by ATC (where required)**





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Cooperative Separation Development

- ETM concept development requires FAA, NASA, industry, State agency, and stakeholder collaboration to evolve the current service mechanisms and realize solutions
- NASA hosted two ETM Tabletops with FAA, industry, and government stakeholder Space Act partners to inform concept development
 - Tabletop #1 (April 2019) focused on understanding planned operations above FL600 and began discussions around a concept of operations for ETM
 - Established ETM foundational principles and assumptions for the cooperative environment
 - Established clear ETM development responsibilities for Industry, FAA, and NASA
 - Tabletop #2 (Dec 2019) explored ETM concept considerations associated with ATC/ETM interactions
 - Identified operational issues/considerations and data impacts associated with operations transitioning to/from ETM environment, operations that occur both above and below FL600, contingency operations, and other topics that impact air traffic control operations
 - Informed FAA ETM Concept of Operations document development
 - Informed engineering plans and considerations





Upper Class E Traffic Management (ETM)

Principles & Assumptions

- The ETM environment is notionally defined as Upper Class E airspace above FL600.
- ETM Operators include - but are not limited to – commercial, public/government, and research entities operating both manned and unmanned vehicles.
- Operations can move across multiple Flight Information Regions (FIRs).
- The ETM supporting architecture and associated services are scalable to meet the needs of market forces.
- Safe separation and demand capacity balancing are enabled through harmonized ETM airspace user interactions, established procedures, and compatible technology.
- FAA retains its authority and responsibility over the airspace.
- The ETM concept will be developed with consideration to international application.





Cooperative Separation

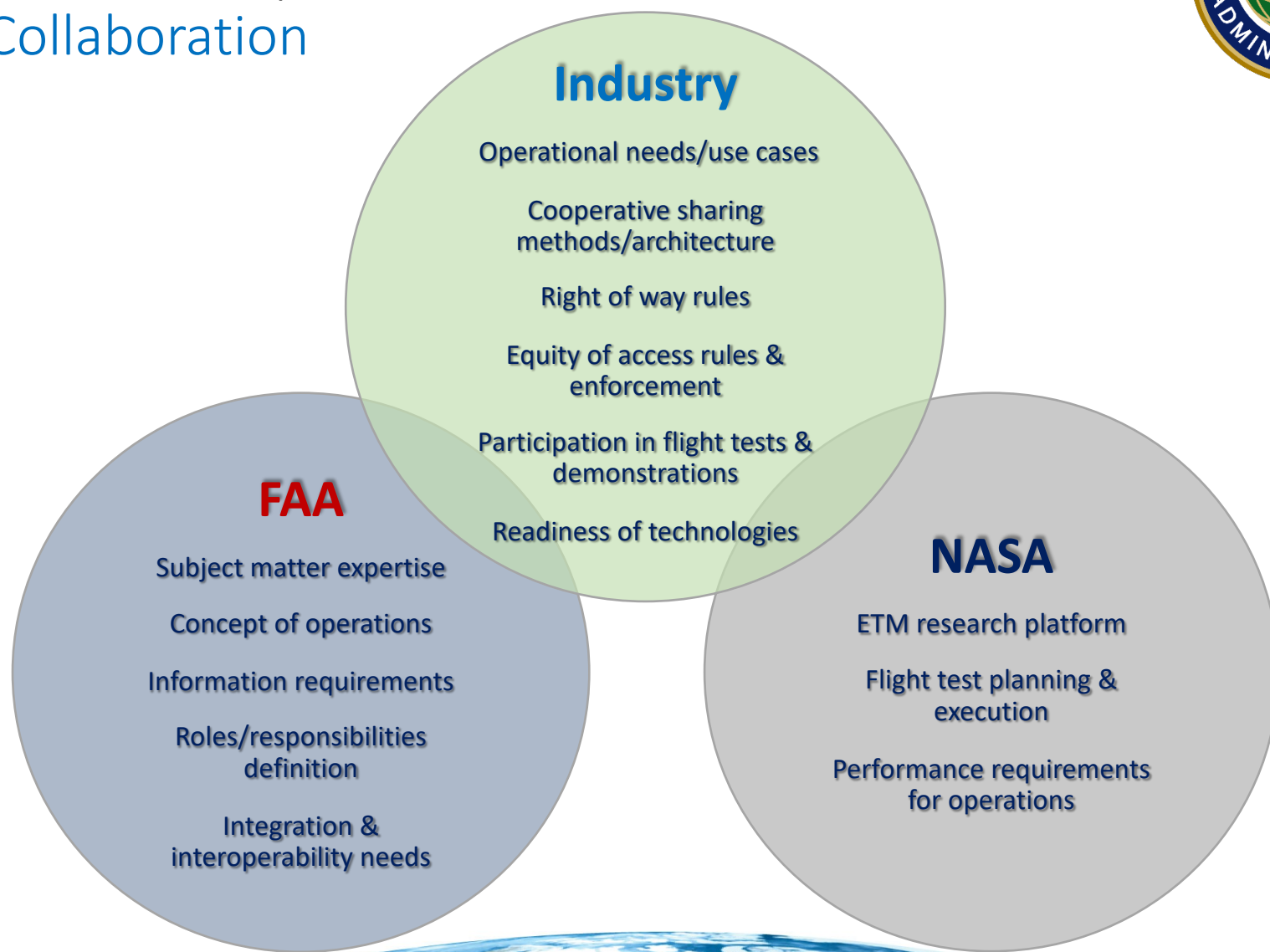
Overview

- Traffic management systems utilizing **cooperative separation** are community-based, where Operators are responsible for the coordination, execution and management of their operations, with community rules of the road approved by the FAA.
- Operators within cooperative separation environments are responsible for maintaining separation from one another.
- Cooperative separation utilizes a separate, collaborative set of separation services from those provided by ATC.
 - This federated set of services enables coordination between vehicle Operators, facilitated by third-party support providers, through networked information exchanges.
- Access to the airspace must be equitable. Operators cannot optimize their own operations at the expense of sub-optimizing the ETM environment as a whole.





ETM Development Collaboration





Moving forward...

- Proceed with development of ETM Concept of Operations to mature and refine the concept through use cases, roles and **responsibilities** allocation, and high-level operational and technical requirements
- Perform engineering analyses to highlight opportunities and challenges in the current infrastructure, technology, policies, and rules with regard to their applicability to support future operations
- Build simulation environment and conduct simulations to derive and validate requirements

